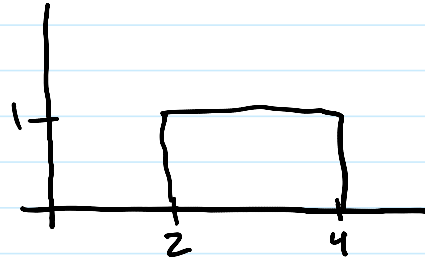
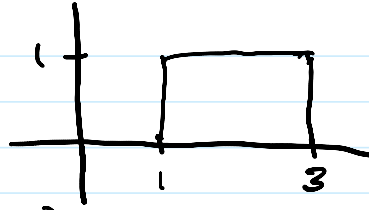


$$1. x(t) = u(t-1) - u(t-3)$$

$$h(t) = \delta(t-1)$$

$$x(t) \cdot h(t) = x(t) \cdot \delta(t-1) = x(t-1)$$

$$= u(t-2) - u(t-4)$$



$$b. h(t) = u(t) - u(t-1)$$

$$x(t) \cdot h(t) = (u(t-1) - u(t-3)) \cdot (u(t) - u(t-1))$$

$$u(t-1) \cdot u(t) - u(t-1) \cdot u(t-1) - u(t-3) \cdot u(t) + u(t-3) \cdot u(t-1)$$

$$u(t-t_1) \cdot u(t-t_2) = r(t - (t_1 + t_2))$$

$$r(t-1) - r(t-2) - r(t-3) + r(t-4)$$



$$2. \text{def } u(t):$$

$$\text{return } 1.0 \cdot (t > 0)$$

$$x = u(t-1) - u(t-3)$$

$$\text{def } \text{delta}(t, f_s):$$

$$\text{return } fs \cdot \text{np.concatenate}([ [0], \text{np.diff}(u(t)) ]) ]$$

$$h1 = \text{delta}(t-1, f_s)$$

$$y = \text{np.convolve}(x, h1)$$

3a.  $h(t) = \delta(t-1)$

b.  $h(t) = 0.1 \delta(t)$

c.  $h(t) = \delta(t-2)$